

Glossary

Section I: Abbreviations and Acronyms

ABCR

annual benefit/cost ratio

ABOM

annual benefit/output measure

AIS

Automated Information System

AR

Army Regulation

BA

Budget Analysis

BCR

Benefit/cost ratio

CEAC

Cost and Economic Analysis Center (U.S. Army)

CIM

Corporate Information Management

DA

Department of the Army

DA PAM

Department of the Army Pamphlet --

DOD

Department of Defense

DPP

discounted payback period

EA

Economic Analysis

EPIR

efficiency/productivity increase ratio

ER --

Engineer Regulation --

EUAC

equivalent uniform annual cost

GS

Grade and Step level

GSA

General Services Administration

HQDA

Headquarters, Department of Army

HQUSACE

Headquarters, U.S. Army Corps of Engineers

IDA

Institute for Defense Analysis

IDEF

Integration Definition Method (or Methodology)

ISSC

Information Systems Software Center (U.S. Army)

MAISRC

Major Automated Information System Review Committee

NPV

net present value

OCE

Office of the Chief of Engineers

O & M

operation and maintenance

PMO

Project Manager's Office

SIR

savings/investment ratio

USACE

U.S. Army Corps of Engineers

USAISC

U.S. Army Information Systems Command

Section II: Terms

Alternative

A course of action, means, or methods by which an objective may be achieved.

Assets

Real and personal property and other items of monetary value.

Assumption

A statement describing unknown factors, data and circumstances that may affect the outcome of the analysis. Used to describe the future environment when factual data about the environment are unknown.

Base Year

The reference year for all present value calculations (costs are converted to present value amounts as of the beginning of the base year).

Benefit

Outputs or effectiveness expected to be received or achieved over time as a result of implementing an alternative. These can be quantifiable in terms of dollars, or nonquantifiable, such as intangible effects (increased morale, etc).

Benefit/Cost Ratio

An economic indicator of efficiency defined as the ratio of the value of benefits to costs. When expressed in dollar terms, both the benefit and cost streams are discounted to reflect the present value of future costs and benefits.

Budget Analysis

Type of analysis which documents the costs of a relatively modest systems resource acquisition (Class VI(C)), and is performed when the range of the anticipated program cost is \$50,000 to \$250,000. In this process, the analyst must consider reasonable solutions to satisfy a problem, then select one for life-cycle costing.

Compound Interest

Interest which is computed on both the original principal and its accrued interest.

Constant Dollars

Estimate in which costs reflect the level of prices of a specified year. Cost estimates expressed in constant dollars imply the purchasing power of the dollar remains unchanged over the analysis period.

Cost/Benefit Analysis

Technique for assessing the range of costs and benefits associated with a certain alternative, usually to determine feasibility. Costs are usually in monetary terms, but benefits need not be.

Cost Element

Basic unit of cost, such as hardware and operations. Related basic units are classified under a cost category (see nonrecurring cost and recurring cost).

Cumulative Net Present Value

The total of the discounted annual cost for the year in question and all preceding years of the project.

Current Dollars

Convention used to show purchasing power in the year spent. Prior costs stated in current dollars are the actual amounts paid out. Future costs stated in current dollars are actual amounts expected to be paid, including increases caused by future price changes (inflation).

Depreciation

A decrease in the value of an asset estimated to have accrued during an accounting period due to age, wear, usage, obsolescence, or the effects of natural elements (decay, corrosion, etc.).

Discount Factor

Multiplier calculated using the present value formula and a discount rate. Used to convert a future cost into its present value.

Discount Rate

Interest rate used to relate present and future dollars. Expressed as a percentage and used to reduce the value of future dollars in relation to present dollars to account for the time value of money.

Discounting

Technique for converting various cash flows occurring over a period of time to equivalent amounts at a common point in time, considering the time value of money, to allow valid comparisons.

Discounting Convention

Method of discounting costs, either at beginning-of-year, middle-of-year, or end-of-year.

Discounted Payback Period (DPP)

Time required for the accumulated present value of savings of a proposed alternative to equal the total present value of

its investment costs.

Economic Analysis

A systematic method for quantifying the costs and benefits of alternative solutions for achieving an objective in order to determine the most economical solution. A structured method to identify, analyze, and compare costs and benefits of the alternatives.

Economic Life

The period of time over which the benefits of the selected alternative are expected to accrue. The economic life of an alternative is often limited by the alternative's physical life (the period of time over which the asset can physically perform) or technological life (the period before the asset becomes technologically obsolete).

Equipment Life

The time during which the equipment of the system is operational without an undue number of repairs and while the vendor continues to provide support.

Equivalent Uniform Annual Cost (EUAC)

The amount of money which, if paid in equal annual installments over the life of a project, would pay for the project. That is, the discounted value of this hypothetical uniform cost stream is equal to the actual estimated present value of project costs. The alternative with the lowest uniform annual equivalent amount is the least costly alternative.

Functional Economic Analysis

See page 5-8.

Historical Cost

Price based on actual monetary outlay, determined after the fact.

Inflation

The rise in costs (or prices) of goods and services over time.

Inherited Asset

An existing asset that will be used in an alternative. If the asset could be used for some other purpose or sold, its value is included as a cost in the alternative. If it has no use or value except in the alternative, no cost is included.

Interest

A price (or rent) charged for the use of money.

Investment Costs

Includes research and development and production and deployment costs of a system. These are usually one-time costs, although they may be spread over more than one year.

Lead Time

The period from the start year to the time that the selected alternative begins to produce benefits, or when the project is complete.

Least-cost Alternative

The alternative that satisfies, at less cost, the same requirements or criteria than another alternative.

Life-cycle cost

The total price of an item over its life cycle. Includes initial investment, maintenance and repair, operations, utilities and, where applicable, disposal.

Net Present Value

The cumulative discounted amount that also includes the discounted value of the residual amount, if any. Equals total discounted costs minus total discounted benefits.

Nonrecurring Cost

Cost that occurs on a one-time basis, as opposed to annual recurring costs.

Objective

The function to be accomplished or the requirement at hand. The objective should be stated in concise, unbiased and, if possible, quantifiable terms.

Opportunity Cost

Amount of money associated with expending capital resources instead of investing them. If funds are expended, the potential that might be gained from investing them is lost.

Output

Products, functions, tasks, services, or capabilities that an organization exists to produce, accomplish, attain, or maintain.

Period of Analysis

The economic life of the selected system alternative plus the lead time, or the period of time from the start year to the end of the economic life.

Physical Life

Estimated number of years that a piece of equipment or building can be physically used in accomplishing the function for which it was procured or constructed.

Present Value

Monetary expenditure (or savings) multiplied by the discount factor. The resulting figure is the worth of the future amount in base year dollars.

Program Costs

Includes all costs incurred from project initiation through full deployment of the system to each operational site. Note how this differs from life cycle costs, which include all costs throughout the entire life cycle of a project.

Project

A major mission-oriented endeavor that fulfills statutory or executive requirements, and that is defined in terms of principal action required to achieve a significant objective.

Real Discount (Interest) Rate

Discount rate with inflation removed.

Recurring Cost

Cost that occurs on a periodic basis, as opposed to one-time, nonrecurring cost.

Replaced Asset

An asset substituted with an alternative. It is made available for other use by the government or is advertised for sale. Its value is subtracted from the NPV of the alternative.

Residual Value

The remaining monetary worth, if any, of an alternative at the end of the period of analysis.

Savings

Reduction in costs achieved without reduction in performance. Always computed with respect to the existing course of action (status quo).

Savings-to-Investment Ratio (SIR)

Ratio of discounted future cost savings to the discounted investment costs necessary to effect those savings. An SIR of 1 indicates that the present value of savings is equal to

the present value of investment.

Sensitivity Analysis

An examination of how the economic analysis results may change with respect to changes in costs timing of costs of an alternative(s). High-cost elements and questionable assumptions should be tested.

Start Year

The first year in which costs occur for the selected alternative. All costs in the budget analysis are estimated to reflect the price level of the start year.

Status Quo

The current method of operations.

Sunk Cost

Cost that occurs before the period of analysis. These costs have no effect on the future and are thus disregarded in the analysis.

Technological Life

The number of years a system or piece of equipment will be used before it becomes obsolete due to changes in technology.

Uncertainty

The state of knowledge about outcomes in a decision which is such that it is not possible to assign probabilities in advance. Doubt or ignorance about the magnitude or timing of costs and benefits.

Wash Cost

A cost that is identical for all alternatives. Omitted from the life-cycle cost analysis and economic analysis because it cannot alter the decision.

Functional Economic Analysis

The Corporate Information Management (CIM) initiative in the Department of Defense has recently established a requirement for functional economic analysis for large automated information systems.

The concept of functional economic analysis is a response to the concern that economic analyses were completed only to receive approval to invest in information systems, and not as an integral part of evaluating the best way to perform a business process.

According to Navy Publication 15, "Functional Economic Analysis Training For Automated Information Systems FEA Submissions", there is a specific way of performing tasks that are unique to a department or functional area. Within a functional area, a person's work can be broken down into distinct activities or job functions, and each of those job functions has a measurable cost, in terms of time, equipment, supplies, etc. Functional economic analysis is the determination and analysis of those functions and associated costs.

The discipline, activity-based costing, allocates these functional costs and can facilitate the accurate measurement of cost and performance associated with a specific activity. The CIM initiative recommends the use of the IDEF modeling methodology for identifying the functions and allocating budgets by cost element across functions performed in a department or business area.

All three concepts -- IDEF methodology, activity-based costing, and functional economic analysis -- are new to most members of the Department of Defense community.

In January 1992, the U.S. Army's Information Systems Software Center (ISSC) and Cost and Economic Analysis Center (CEAC) conducted a joint training program on functional economic analysis. The remainder of this paper outlines the points that were presented at the training program.

There are six basic component of the functional economic analysis concept. They are listed below.

SIX BASIC COMPONENTS OF FEA CONCEPT

1. There is a process of doing business at the functional level. This process can be modeled and costs can be determined.
2. Functional costs can be divided into two general areas. They are Direct and Indirect.
3. Management initiatives can identify alternatives which, when implemented, will reduce the cost of doing business.
4. These potential reductions establish hard savings which can be used to measure the worth of competing alternatives. Hard savings are defined as money that can be permanently removed from an agency's budget.
5. Management initiatives may focus on technology but must also include reducing overhead and eliminating redundancy.
6. Capital investment is normally required to improve business processes, and savings can be tied directly to this expenditure.

Following these six concepts, ISSC and CEAC identified eight essential elements of the FEA process. They are listed below.

EIGHT ESSENTIAL ELEMENTS OF THE FEA PROCESS

1. Define the Functional Area.
2. Model the process and system flow.
3. Gather costs as a by-product of the model.
4. List all feasible alternatives.
5. Estimate costs of each feasible alternative within the process model boundaries.
6. Perform (analytically) the functional economic analysis.
7. Select the best alternative within funding constraints.
8. Implement and track the expenditure of funds and the accrual of benefits.

Note that these eight elements are not significantly different from the seven steps of financial analysis. Key differences are elements two and three which indicate the emphasis on modeling. In addition, element eight includes the follow-up after the alternative has been selected and implemented, whereas financial analysis ends with the selection. The distinction is that these essential elements focus on the process of which FEA is one element.

The concepts of functional economic analysis and business process are new to the Department of Defense and are untested. The representatives of ISSC and CEAC cautioned persons at the training session that implementing these new concepts will take time. In addition, the format of functional economic analysis has its emphasis on direct versus indirect costs and there is a lack of audit trails. This does not con-

form to the current requirements set by the Department of Defense's Major Automated Information System Review Council (MAISRC). The trainers presented eight points of caution for the attending persons. They are listed below.

FEA'S - REALITY FOR 1992

1. This is a pioneering effort and very few examples are available to use as benchmarks.
2. An FEA could take twice as long as an economic analysis.
3. There are short term requirements to support future expenditures.
4. There is only a generalized format and the cost cells are unique.
5. Overhead must be costed, and this was never done before.
6. In the short term, the FEA's are a restatement of validated EA data into a new generic format.
7. Functional Areas are not neatly divided and overlap.
8. FEA's do not currently support the MAISRC process.

The currently accepted FEA computer software model is the Institute for Defense Analysis (IDA) model. Information on it can be acquired by contacting:

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